Atty. Docket No.: 3135-Z

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of
Dharapuram N. Srinath et al
Serial No. 10/016,131 Group Art Unit 3752
Filed: December 17, 2001 Christopher S. Kim
For: METHOD AND APPARATUS FOR GENERATION OF LOW IMPACT SPRAYS

AMENDED APPEAL BRIEF TRANSMITTAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Attached hereto are three (3) copies of the AMENDED BRIEF ON APPEAL for the above-identified application. This is being filed in response to the Notification of Non-Compliant Appeal Brief mailed December 14, 2005. The payment of the brief in the amount of $250.00 was paid with the filing of the BRIEF ON APPEAL on June 28, 2005.

Any additional fees necessary to effect the proper and timely filing of this Brief may be charged to Deposit Account No. 26-0090.

Respectfully submitted,

Jim Zegeer, Reg. No. 18,957
Attorney for Appellants

Attachments: Amended Brief on Appeal (3 copies)

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Date: January 11, 2006

In the event this paper is deemed not timely filed, the applicant hereby petitions for an appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 26-0090 along with any other additional fees which may be required with respect to this paper.

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AMENDED BRIEF ON APPEAL

Commissioner for Patents
P.O. Box 1450
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Sir:

This is an appeal from the final rejection mailed December 29, 2004 of Claims 1, 2, 4, 6, 7, 11, 12 and 13 of the above-identified application.

I. The Real Party in Interest

The real party in interest is Bowles Fluidics Corporation.

II. Related Appeals and Interferences

There are no related appeals or interferences.

III. Status of the Claims

Claims 1, 2, 4, 6, 6, 7, 11 and 12 and 13 are all under appeal. All other claims have been cancelled.

IV. Status of the Amendments

An amendment was filed after the final rejection but did not result in allowance of the application.

V. Summary of Claimed Subject Matter

The invention is directed to a device for producing a spray of liquid droplets which project with a momentum such that the liquid droplets do not bounce off of a selected surface. All of the fluidic oscillators utilized are conventional in the sense that they are disclosed in the prior art. What is novel is the combination of a fluidic oscillator connected to a liquid source by a non-restrictive pressure reducer and wherein the spray droplets issuing from the fluidic spray nozzle have reduced velocity so that the spray droplets do not bounce off of the surface which is being cleaned.

Figures 1, 3, 5, 7 and 8 are produced on the following page for convenience of reference:

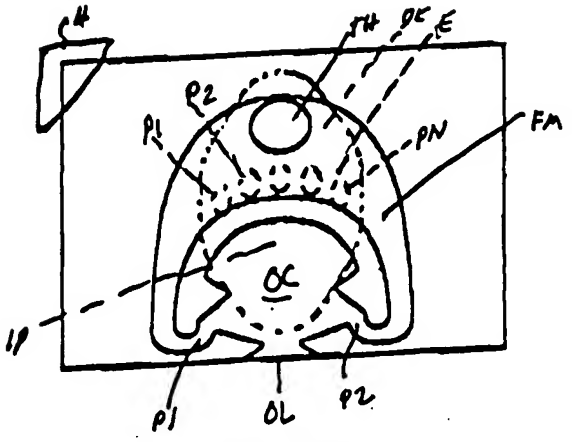


FIGURE 1

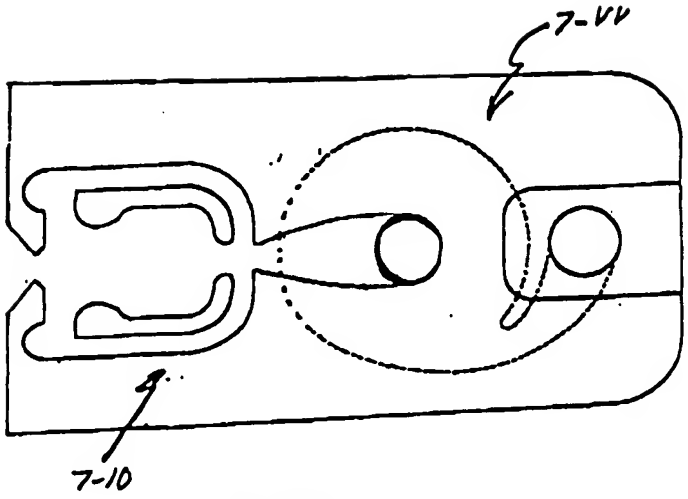


FIGURE 7

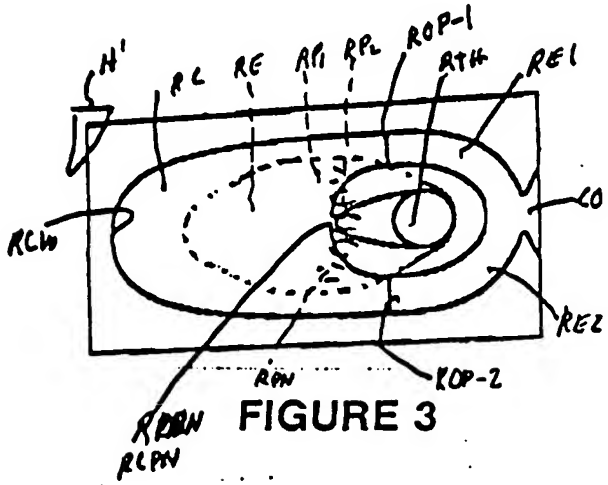


FIGURE 3

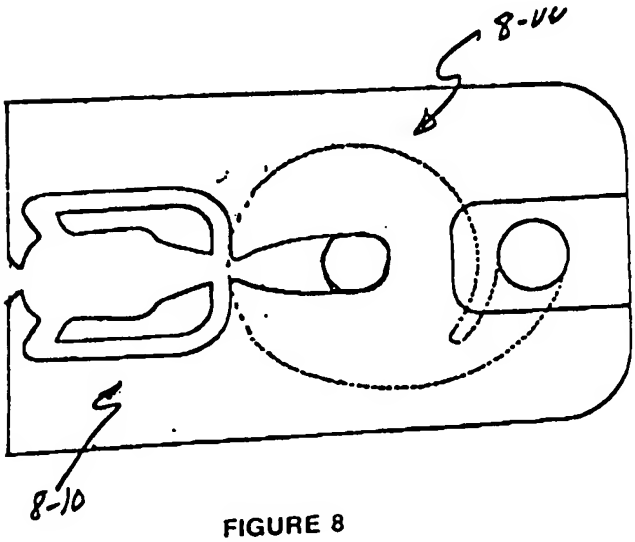


FIGURE 8

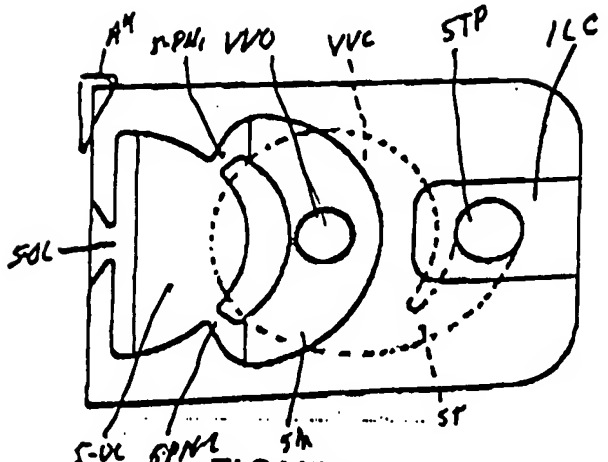


FIGURE 5

In one embodiment (Figure 1), the fluidic oscillator is the type disclosed in Raghu Patent No. 6,253,782 which is combined with a bi-level filter shown in Srinath Patent No. 6,186,409. In another embodiment (Figure 3), the bi-level filter is combined with a reversing chamber oscillator as shown in Srinath et al Patent No. 6,186,409. In still another embodiment of the invention (Figure 5), a vortex valve is placed in advance of an inlet flow of the power nozzle fluidic oscillator of the type shown in Raghu's patent. In yet another embodiment of the invention (Figure 7), a conventional fluidic oscillator with control passages of the type disclosed in Stouffer Patent No. 4,508,267 is coupled with an upstream vortex valve, or a conventional prior art oscillator as shown in Bray Patent No. 4,463,904 (Figure 8) is combined with the upstream vortex valve pressure reducer.

The following claim annotation is a concise explanation of the subject matter defined in each of the independent and dependent claims involved in the appeal referring to the specification by page and line number, the drawings and the reference characters and identifies each independent claim involved in the appeal and every means plus function under 35 U.S.C. 112, sixth paragraph, and sets forth the structure and material or acts described in the specification as corresponding to each claim function and with reference to the specification by page and line number and to the drawings by reference characters. Note in particular the references in claims 7 and 11 which identify the means plus

function clauses in these claims and which is in full compliance with paragraph 7 of the final action mailed December 29, 2004:

1. A fluidic spray system for producing a spray of liquid droplets projected with a momentum such that said liquid droplets do not bounce off of a selected surface, comprising in combination, a fluidic oscillator (Figures 5, 7 and 8) coupled to a supply of liquid under pressure and a vortex valve (Figures 5, 7 and 8: VVC, 7-VV and 8VV, respectively, page 11, paragraph 2; page 12, paragraph 2) immediately upstream of said fluidic oscillator .

2. A fluidic spray system for producing a liquid spray in which the spray droplets have a momentum which allows spray droplets to be delivered to a selected surface area without said spray droplets bouncing off of said selected surface, comprising, a fluidic oscillator connected to a source of liquid under pressure and wherein said fluidic oscillator is selected from:

a multiple power nozzle oscillator (Figure 1: page 9, paragraphs 1 and 2),

a reversing chamber oscillator (Figure 3: page 10, paragraph 1, lines 6-7), and

a feedback oscillator (Figures 7 and 8: page 12, lines 3-11), and

a non-restrictor pressure reducer upstream of said fluidic oscillator (flow reverser TH and RTH in Figures 1 and 2: page 9, paragraph 1, line 10; vortex valve in Figures 5, 7 and 8: page 11, paragraph 1; page 12, lines 3-11).

4. The fluidic spray system defined in claim 2 wherein said non-restrictor pressure reducer is a vortex valve (Figure 5: VVC, page 11, line 4 *et seq,* Figure 7: 7-VV, Figure 8: 8-VV, page 12, paragraph 1).

6. A fluidic spray system for producing a liquid spray in which the spray droplets have a momentum such that said spray droplets do not bounce on impacting a surface and allows substantially unrestricted flows to be delivered to a point of utilization on said surface comprising a fluidic oscillator (Figure 5, Figure 7: 7-10, Figure 8: 8-10) having an input coupled to a supply of liquid under pressure and a vortex valve (Figure 5: VVC, Figure 7: 7-VV, Figure 8: 8-VV) immediately upstream of said fluidic oscillator, said vortex valve having an output which is connected to the input of said fluidic oscillator (page 11, paragraph 1, lines 3-27; page 12, lines 1-23).

7. A fluidic oscillator spray system comprising a fluidic oscillator (Figures 1 and 5: multiple power nozzle type; Figure 7: 7-10, Figure 8: 8-10) and non-restrictor pressure reducing means (Figures 1 and 2: TH and RTH; Figure 7: 7-VV, Figure 8: 8-VV; coupling said oscillator to a source of liquid for producing a liquid spray in which the spray droplets have a momentum and allows for producing droplets of larger diameters and a selected range of diameters for similar operating pressures (page 9, line 16 *et seq*; page 12, lines 3-10).

11. A device for producing spray droplets which are adapted to adhere to a surface comprising, a fluidic spray nozzle (Figures 1, 3, 5, 7 and 8, the full line spray nozzle silhouettes) connectable to a source of liquid under pressure, means (Figures 1 and 3: flow reverser, TH and RTH; page 9, line 11, vortex valve, Figure 5: VVC, Figure 7, 7-VV, Figure 8: 8-VV, page 12, lines 1-23) for reducing the velocity of spray droplets issuing from said fluidic spray nozzle so that said spray droplets have energy such that they do not bounce off said surface.

12. The device defined in claim 11 wherein said fluidic spray nozzle is selected from the following:

(a) low frequency multiple power nozzle oscillator (Figure 1), and

(b) a filter and reversing chamber oscillator (Figure 3).

13. The device defined in claim 11 wherein said fluidic spray nozzle includes a first and second sided molded chip (Figures 1 and 3) having a fluidic oscillator formed in said first side and a feed circuit formed in said second side, and reducing pressure by feeding liquid from said first side to said second side (via TH Figure 1; RTH Figure 3), and reversing the direction of liquid flow thereof (page 9, line 11).

The advantages of the invention are as follows:

(1) Large flow channels decrease the possibility of clogging, compared to restrictors.

(2) Including a filter as illustrated in the reversing chamber circuit as an example will allow the nozzle to remain functional even if there are particulates in the flow.

(3) The invention allows for adequate flow rates for the intended purpose, such as rear window washing in cars, under low temperature environments.

(4) Controlled distribution of the liquid allows for delivering the liquid to the desired area without overspray or bouncing off the surface.

(5) The invention allows wide spray angles to be designed to cover large areas, without bouncing off the surface.

VI. Grounds of Rejection to be Reviewed on Appeal

Ground No. 1

Claims 2 and 4 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description request.

Ground No. 2

Claims 11 - 13 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Ground No. 3

Claims 1, 6, 7, 11 and 12 were rejected under 35 U.S.C. §102(b) as being anticipated by Babich et al (US 4,205,786) (hereinafter "Babich").

Ground No. 4

Claims 1, 2, 4, 6, 7 and 11 - 13 were rejected under 35 U.S.C. §102(b) as being anticipated by Nekrasov et al (US 3,614,961).

Ground No. 5

Claim 2 was rejected under 35 U.S.C. §102(e) as being anticipated by Raghu (US 6,253,782).

VII. Argument

As to Ground No. 1, the rejection of claims 2 and 4 under 35 U.S.C. §112, first paragraph, is clearly in error. The Examiner contends that: "The disclosure as originally filed fails to disclose the fluidic oscillator as being a non-restrictor pressure reducer upstream of itself," and this is so: The non-restrictor pressure reducer is upstream of the fluidic oscillator. The Examiner has misinterpreted the language. Claim 2 recites a fluidic oscillator connected to a source of liquid under pressure and wherein the fluidic oscillator is from a group of three fluidic oscillators:

> "a multiple power nozzle oscillator,
> a reversing chamber oscillator, and
> a feedback oscillator...."

The claim then recites "and a non-restrictor pressure reducer upstream of said fluidic oscillator." With the word "and" interposed after the recitation of the third type of fluidic oscillator is a further element and not a part of the listed selected of fluidic oscillator types.

As to Ground No. 2, the objection to claims 11 - 13 under 35 U.S.C. §112, second paragraph, has been obviated by an amendment to claim 12.

The objection to claim 13 has been avoided by deleting the admittedly confusing word "two-".

As to Ground No. 3, the rejection of claims 1, 6, 7, 11 and 12 under 35 U.S.C. §102(b) as being anticipated by Babich is in error.

Initially, it will be noted that this Babich patent (Figs. 1 and 2 of Babich are reproduced on the following page for convenience of reference) relates to: "heat-power engineering and has particular reference to atomizing device...." (Col. 1, lines 1-2). The present invention, on the other hand, is directed to a device for producing a spray of liquid droplets which project with a momentum such that the liquid droplets do not bounce off of a selected surface. Clearly, the Babich reference is not analogous art, does not deal with liquid droplets that do not bounce off of a selected surface and does not relate to spray liquid droplets as having low momentum and which are delivered to a surface or area without spray droplets bouncing off of a selected surface. See claims 1 and 2. Moreover, claim 1 recites a fluidic oscillator coupled to a supply of liquid under pressure and a vortex valve

United States Patent 4,205,786
Babich et al.

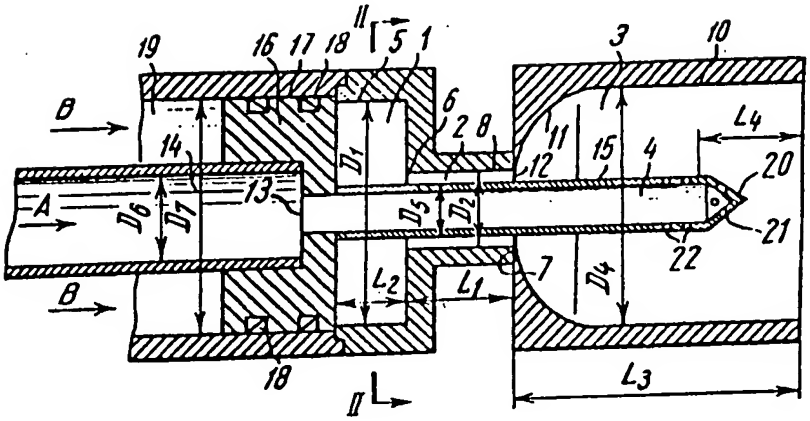
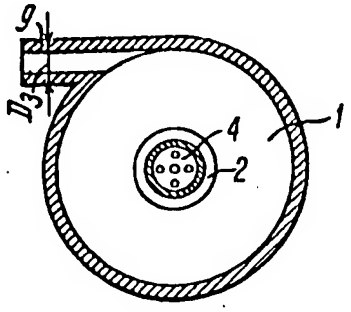


FIG.1



immediately upstream of said fluidic oscillator. This is not the case with Babich. In Babich, the swirl chamber 1 is provided with a nozzle and a pipe 4 running coaxially through the swivel chamber 1 and a nozzle into the zone of material atomization. The material to be atomized is fed through passage in channel A into pipe 4 and to outlet apertures 21. The second chamber 10 is an ultrasonic wave resonator. Obviously, the swirl chamber 1 is not used as a vortex valve, and it is not upstream of a fluidic oscillator. In Babich, the swirl chamber 1 is adapted to rotate the flow of an "atomizing gas." There is no fluidic oscillator coupled to a supply of liquid under pressure and a vortex valve immediately upstream of the fluidic oscillator.

A gas is not a liquid, and it does not form droplets. The droplets are formed by the atomization of the material fed through passage A.

In regard to claim 6, the Babich reference has no fluidic oscillator having an input coupled to a supply of liquid under pressure and a vortex valve immediately upstream of the fluidic oscillator, said fluidic valve having an output which is connected to the input of the fluidic oscillator as recited in claim 6.

Claim 7 calls for an oscillator coupled to a source of liquid for producing a liquid spray which spray droplets have a low momentum and allows for producing droplets of larger diameters and a selected range of diameters for similar operating pressures which is not disclosed in the reference.

Claim 11 recites a device for producing droplets which adhere to a surface comprising "...means for reducing the velocity of spray droplets issuing from said fluidic spray nozzle so that said spray droplets have energy such that they do not bounce off said surface." There is no teaching or suggestion of this function and result in the Babich reference. It is not inherent therein.

In Babich and Nekrasov, liquid (fuel) to be atomized is fed into an ultrasonic oscillator wave field to break up the liquid into small droplets. In contrast, fluidic oscillators of the type specified in claim 2, for example, wave a liquid jet back and forth in ambient air to cause the jet of liquid to form the low momentum droplets.

Claim 12 depends from claim 11 and recites that the fluidic spray nozzle is selected from a low frequency multiple power nozzle oscillator such as shown in Figures 5 and 6 and a filter having a reversing chamber oscillator such as shown in Figure 3. No such construction is disclosed in the Babich reference.

As to Ground No. 4, the rejection of claims 1, 2, 4, 6, 7 and 11 - 13 under 35 U.S.C. §102(b) as being anticipated by Nekrasov is clearly in error. The Examiner's rejection reads as follows:

> Nekrasov discloses a fluidic spray system comprising a fluidic oscillator 2, 7 coupled to a supply of liquid A, B and a vortex valve 1.

As discussed above, Nekrasov (A xerographic collage of Figs. 1-6 of Nekrasov is reproduced on the following page for convenience of reference) is directed to an ultrasonic generator, its title reading: "Method of Generating Vibrations in the Sonic and Ultra-

Sonic Frequency Ranges and Devices for Carrying Said Method into Effect."

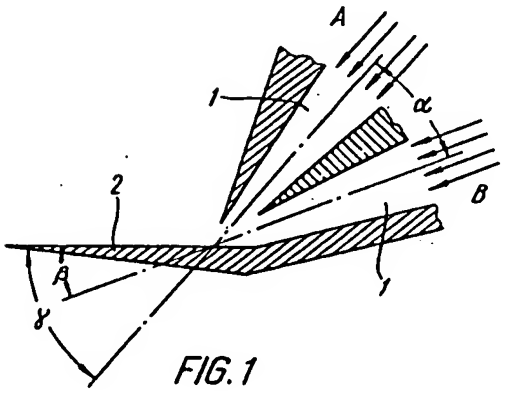


FIG. 1

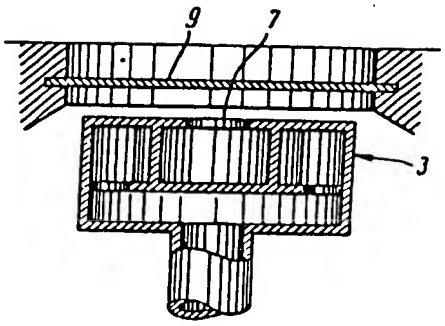


FIG. 3

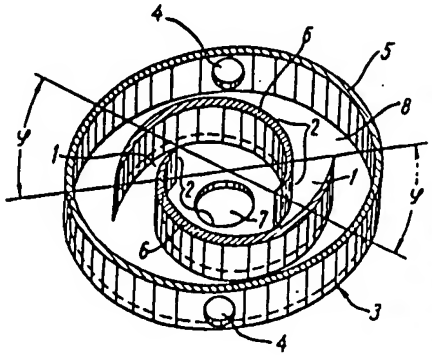


FIG. 2

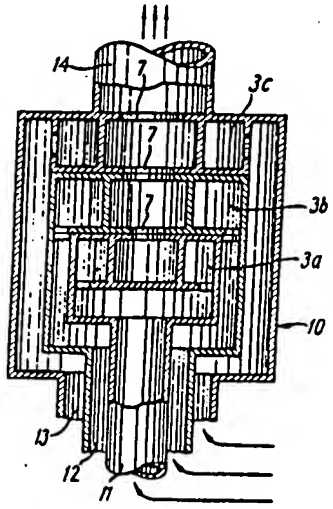


FIG. 4

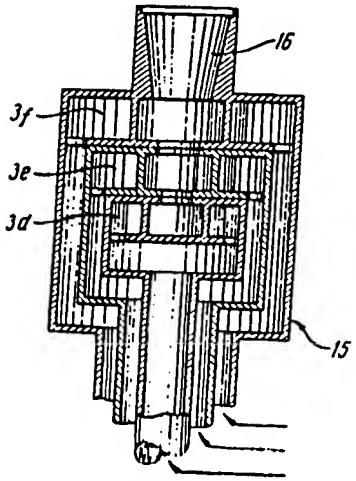


FIG. 5

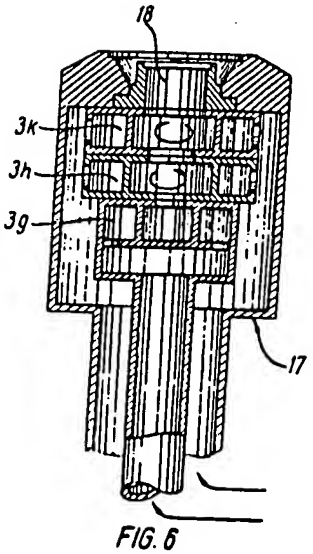


FIG. 6

In the preamble to Nakrasov's specification, Nekrasov states:

> This invention relates to ultrasonic vibration generators, and to a method of generating sonic and ultrasonic oscillations as well as to devices for carrying out this method.

This is hardly in applicant's field and is clearly not analogous art.

Moreover, the claims are not anticipated or made obvious by this reference.

Claim 1 recites a "fluidic oscillator coupled to a supply of liquid under pressure and a vortex valve immediately upstream of said fluidic oscillator." Nekrasov does not seek to provide liquid droplets projected with momentum such that they do not bounce off of a selected surface.

Nekrasov states:

> It is common knowledge that a droplet size, either for liquid or for mixture of liquids dispersed with the aid of some gas or stream, depends upon the amplitude and frequency of vibrations imparted to a dispersed liquid and to a liquid and to a dispersing gas.
> (Col. 4, lines 37 *et seq.*)

They state that the test ultrasonic fuel burner made according to their invention provides the dispersion of fuel to droplets less than 15 microns in size under a pressure of 4 to 6 atm. gauge for the fuel and of 4 to 4 atm. gauge for the dispersing agent (air or steam).

The present applicants do not seek to atomize as does Nekrasov and Babich.

While Nekrasov's resonators may be termed "fluid effect" devices, they are not fluidic spray systems and do not produce low

momentum liquid droplets projected with a momentum such that they do not bounce off of a selected surface. They do not appear to be coupled to a liquid supply in the manner defined by the claims,and there is no vortex valve immediately upstream and the fluid upstream of the fluidic oscillator. Claim 2 calls for a fluidic spray system for producing a liquid spray in which the spray droplets have a momentum which allows them to be delivered to a selected surface area without bouncing off and also calls for a multiple power nozzle fluidic oscillator, a reversing chamber oscillator, a feedback oscillator (all of which cause droplet formation by sweeping a liquid jet back and forth in the ambient) and a non-restrictor pressure reducer upstream of the fluidic oscillator. There is no such construction or teaching of this in the reference. An ultrasonic whistle is not a vortex valve upstream of a fluidic oscillator (claims 2 and 6), and an ultrasonic whistle and a supply of liquid for atomization is not a "non-restrictor pressure reducing means coupling a fluidic oscillator to a source of liquid (claims 7 and 11); and there is no disclosure in Nekrasov of a multiple power nozzle oscillator or a reversing chamber oscillator (claim 12). And, manifestly, Nekrasov does not disclose the molded chip structure recited in claim 13.

As to Ground No. 5, the rejection of claim 2 under 35 U.S.C. §102(e) is in error because Raghu (US 6,253,782) is not prior art. See 35 U.S.C. §103(c). This application and Patent No.6,253,782 were copending and are owned by the same entity.

Moreover, the rejection of claim 2 under 35 U.S.C. §102(e) as being anticipated by Raghu (a coinventor of the present application) is erroneous. The claim recites:

> A fluidic spray system for producing a liquid spray in which the spray droplets have a momentum which allows spray droplets to be delivered to a selected surface area without said spray droplets bouncing off of said selected surface, comprising, a fluidic oscillator connected to a source of liquid under pressure and wherein said fluidic oscillator is selected from:

Three broad categories of fluidic oscillators are listed:

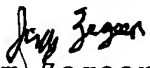
> a "multiple power nozzle" type fluidic oscillator, along with two other types of fluidic oscillators,
>
> and "a non-restrictor pressure reducer upstream of said fluidic oscillator."

Raghu discloses a multiple power nozzle type fluidic oscillator but does not disclose a spray system having an upstream non-restrictor pressure reducer.

CONCLUSION

In conclusion, the Examiner has erred in finally rejecting claims 1, 2, 4, 6, 7, 11, 12 and 13 and should be reversed.

Respectfully submitted,



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Attachment: VIII. CLAIMS APPENDIX
IX. EVIDENCE APPENDIX
X. RELATED PROCEEDINGS APPENDIX

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Date: January 11, 2006

In the event this paper is deemed not timely filed, the applicant hereby petitions for an appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 26-0090 along with any other additional fees which may be required with respect to this paper.

VIII. CLAIMS APPENDIX

1. A fluidic spray system for producing a spray of liquid droplets projected with a momentum such that said liquid droplets do not bounce off of a selected surface, comprising in combination, a fluidic oscillator coupled to a supply of liquid under pressure and a vortex valve immediately upstream of said fluidic oscillator.

2. A fluidic spray system for producing a liquid spray in which the spray droplets have a momentum which allows spray droplets to be delivered to a selected surface area without said spray droplets bouncing off of said selected surface, comprising, a fluidic oscillator connected to a source of liquid under pressure and wherein said fluidic oscillator is selected from:

a multiple power nozzle oscillator,

a reversing chamber oscillator, and

a feedback oscillator, and

a non-restrictor pressure reducer upstream of said fluidic oscillator.

4. The fluidic spray system defined in claim 2 wherein said non-restrictor pressure reducer is a vortex valve.

6. A fluidic spray system for producing a liquid spray in which the spray droplets have a momentum such that said spray droplets do not bounce on impacting a surface and allows substantially unrestricted flows to be delivered to a point of utilization on said surface comprising a fluidic oscillator having an input coupled to a supply of liquid under pressure and a vortex valve immediately upstream of said fluidic oscillator, said vortex

valve having an output which is connected to the input of said fluidic oscillator.

7. A fluidic oscillator spray system comprising a fluidic oscillator and non-restrictor pressure reducing means coupling said oscillator to a source of liquid for producing a liquid spray in which the spray droplets have a momentum and allows for producing droplets of larger diameters and a selected range of diameters for similar operating pressures.

11. A device for producing spray droplets which are adapted to adhere to a surface comprising, a fluidic spray nozzle connectable to a source of liquid under pressure, means for reducing the velocity of spray droplets issuing from said fluidic spray nozzle so that said spray droplets have energy such that they do not bounce off said surface.

12. The device defined in claim 11 wherein said fluidic spray nozzle is selected from the following:

(a) low frequency multiple power nozzle oscillator, and

(b) a filter and reversing chamber oscillator.

13. The device defined in claim 11 wherein said fluidic spray nozzle includes a first and second sided molded chip having a fluidic oscillator formed in said first side and a feed circuit formed in said second side, and reducing pressure by feeding liquid from said first side to said second side, and reversing the direction of liquid flow thereof.

IX. EVIDENCE APPENDIX

There are no proceedings as mentioned in section I above, and accordingly no decisions rendered.

X. RELATED PROCEEDINGS APPENDIX

There are no related proceedings.